

# **PORT COLBORNE**

## **water pollution control plant**

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ONTARIO WATER RESOURCES COMMISSION  
OFFICE OF THE GENERAL MANAGER

Members of the Port Colborne Local Advisory Committee,  
City of Port Colborne.

Gentlemen:

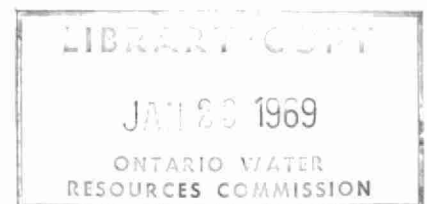
We are happy to present you with the 1967 Operating Summary for the Port Colborne Water Pollution Control Plant, OWRC Project Nos. 2-0047-59. 2-0073-60 and 2-0108-62.

Your co-operation with our staff throughout the year has been appreciated. Only with such co-operation can the war against water pollution be waged effectively.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly".

D. S. Caverly,  
General Manager.





ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

TELEPHONE 365-

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J. H. H. ROOT, M.P.P.  
VICE-CHAIRMAN

D. S. CAVERLY  
GENERAL MANAGER

W. S. MACDONNELL  
COMMISSION SECRETARY

General Manager,  
Ontario Water Resources Commission.

Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Port Colborne Water Pollution Control Plant, OWRC Project Nos. 2-0047-59, 2-0073-60 and 2-0108-62.

The summary reviews progress during the year, outlines operating problems encountered and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

A handwritten signature in dark ink, reading "D. A. McTavish". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

D. A. McTavish, P. Eng.,  
Director,  
Division of Plant Operations.

## FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

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**PORT COLBORNE**  
**water pollution control plants**

operated for

THE CITY OF PORT COLBORNE

by the

ONTARIO WATER RESOURCES COMMISSION

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Assistant Director:	C. W. Perry
Regional Supervisor:	A. C. Beattie
Operations Engineer:	R. S. McKittrick

801 Bay Street Toronto 5

# '67 REVIEW

Secondary treatment was provided for a total of 802.968 million gallons of raw sewage in 1967 at both the East Side and West Side plants. This is an increase of 15 percent in relation to the 1966 total flow. The dry weather flow capacity at the West Side plant was exceeded 83 percent of the time. However, this has not yet seriously affected the degree of treatment achieved. There was no improvement in the condition of the East Side plant during the past year and excessive hydraulic loading and mechanical failure resulted in considerable by-passing during wet weather periods and an inferior plant effluent, particularly during the winter months.

The raw sewage strengths at both plants were again below that normally anticipated for domestic sewage. This is an indication of excessive infiltration to the sewers or an uneconomical use of water by residents in the city, resulting in considerable waste to the sewers. The degree of efficiency achieved at the West Side plant was satisfactory during the past year with OWRC effluent quality objectives of 15 ppm BOD and suspended solids exceeded 12 percent and 16 percent of the time respectively. The East Side plant exceeded OWRC objectives for BOD and suspended solids 62 percent and 87 percent of the time respectively.

The condition of the East Side plant remained well below OWRC standards during the year. As in past years, there was again a major breakdown of one of the mechanical aerators during the winter which, it is believed, was caused by excessive deflection of the reinforced concrete support bridges. Repairs to equipment are on a breakdown basis and breakdowns are becoming more frequent as the equipment and structures deteriorate.

The routine maintenance of the West Side plant and satellite pumping station was satisfactory at the year's end.

Due to excessive flow to the Fretz Park pumping station during periods of high surface run off, it was again recommended to the municipality during the past year that the reserve fund be utilized to install a third pump. Once again no decision was reached by the city on this matter.

Plant supervision is on a 24 hour basis, seven days per week. The plant staff complement consists of six operators, one mechanic and a superintendent.



## PROJECT COSTS

2-0047-59

NET CAPITAL COST (Estimated) Long Term Debt to OWRC	\$ <u>625,008.36</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967	\$ <u>89,001.58</u>
Net Operating	\$ 71,358.82
Debt Retirement	12,613.00
Reserve	3,426.45
Interest Charged	35,246.39
TOTAL	<u>\$122,644.66</u>

### RESERVE ACCOUNT

Balance at January 1, 1967	\$ 24,648.59
Deposited by Municipality	3,426.45
Interest Earned	<u>1,451.38</u>
	\$ 29,526.42
Less Expenditures	<u>(1,500.00)</u>
Balance at December 31, 1967	\$ <u>28,026.42</u>

2-0073-60

NET CAPITAL COST (Estimated)	\$325,199.95
DEDUCT - Portion Financed by CMHC (Estimated)	<u>47,154.39</u>
Long Term Debt to OWRC	<u>\$278,045.56</u>
 Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967	 \$ <u>56,869.76</u>
 Net Operating	 \$ 38.91
Debt Retirement	10,088.00
Reserve	1,928.00
Interest Charged	15,679.92
	<u>                  </u>
TOTAL	\$ <u>27,734.83</u>

RESERVE ACCOUNT

Balance at January 1, 1967	\$ 10,076.93
Deposited by Municipality	1,928.00
Interest Earned	<u>614.01</u>
	\$ 12,618.94
 Less Expenditures	 <u>-</u>
Balance at December 31, 1967	\$ <u>12,618.94</u>

2-0108-62

NET CAPITAL COST (Estimated)		\$291,992.10
DEDUCT - Payments from Municipalities	\$87,025.24	
- Portion Financed by CMHC (Estimated)	\$78,293.33	<u>165,318.57</u>
Long Term Debt to OWRC		<u>\$126,673.53</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967		\$ <u>20,542.94</u>
Net Operating		\$ 49.99
Debt Retirement		4,596.00
Reserve		1,320.41
Interest Charged		7,143.55
		<u>          </u>
TOTAL		\$ <u>13,109.95</u>

RESERVE ACCOUNT

Balance at January 1, 1967	\$ 4,787.59
Deposited by Municipality	1,320.41
Interest Earned	<u>300.85</u>
	\$ 6,408.85
Less Expenditures	<u>-</u>
Balance at December 31, 1967	\$ <u>6,408.85</u>

## MONTHLY OPERATING COSTS

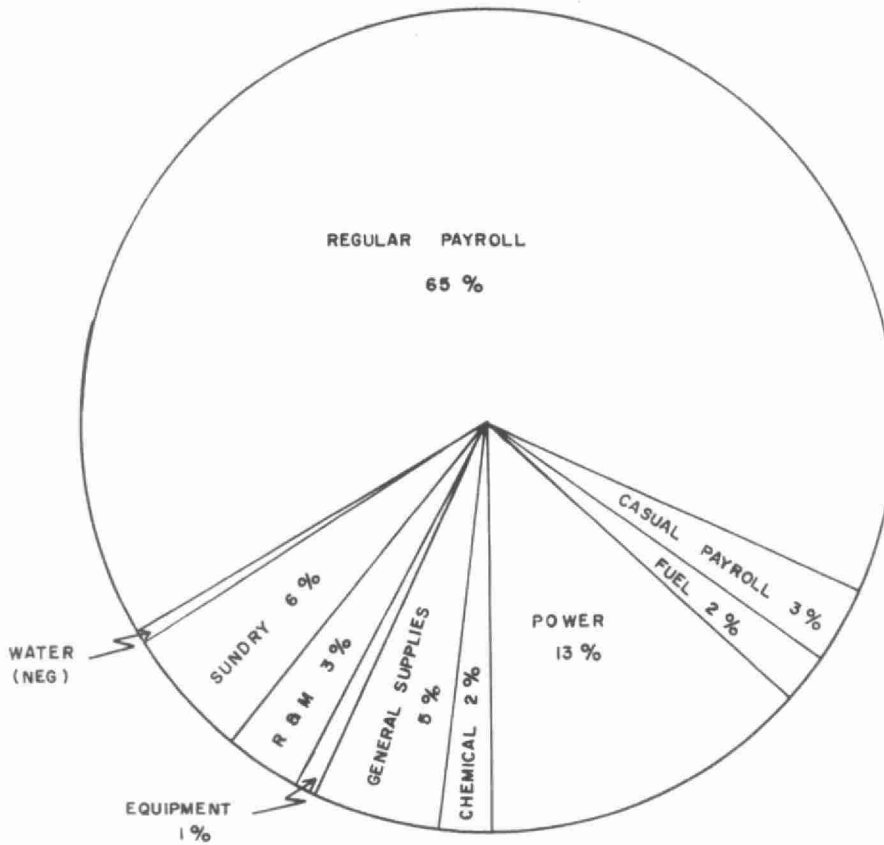
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	5826.79	3325.95		203.14	1808.89	228.38	171.57		47.75	41.11	
FEB	3931.56	3299.72	93.24	138.45			85.88			267.41	46.86
MARCH	7580.09	5540.86	298.45	174.24	770.68		315.94		283.70	196.22	
APRIL	5766.88	3479.59	75.45	171.51	838.23	228.38	276.03	274.68	59.34	363.67	
MAY	5335.97	3805.00	262.89	85.55	734.04	228.38	113.14		54.96		52.01
JUNE	4286.99	3474.10	65.60	85.32			276.72		20.39	364.86	
JULY	5942.16	3474.10	225.87	56.29	1422.19		250.96	51.98	154.41	268.00	38.36
AUG	4807.39	3501.54	344.82	25.38		238.61	381.50		69.89	245.65	
SEPT	7379.71	5744.73	345.60	23.28	777.59		185.54		162.93	140.04	
OCT	6090.33	3652.63	192.62	87.23	721.13	238.61	654.69		94.57	409.14	39.71
NOV	6487.16	3648.60	131.61	42.44	818.20	238.61	146.76		644.85	816.09	
DEC	7923.79	3649.35		247.29	1562.15	238.61	629.50	282.96	579.36	734.57	
TOTAL	71358.82	46596.17	2036.15	1340.12	9453.10	1639.58	3488.23	609.62	2172.15	3846.76	176.94

\* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$2,484.49

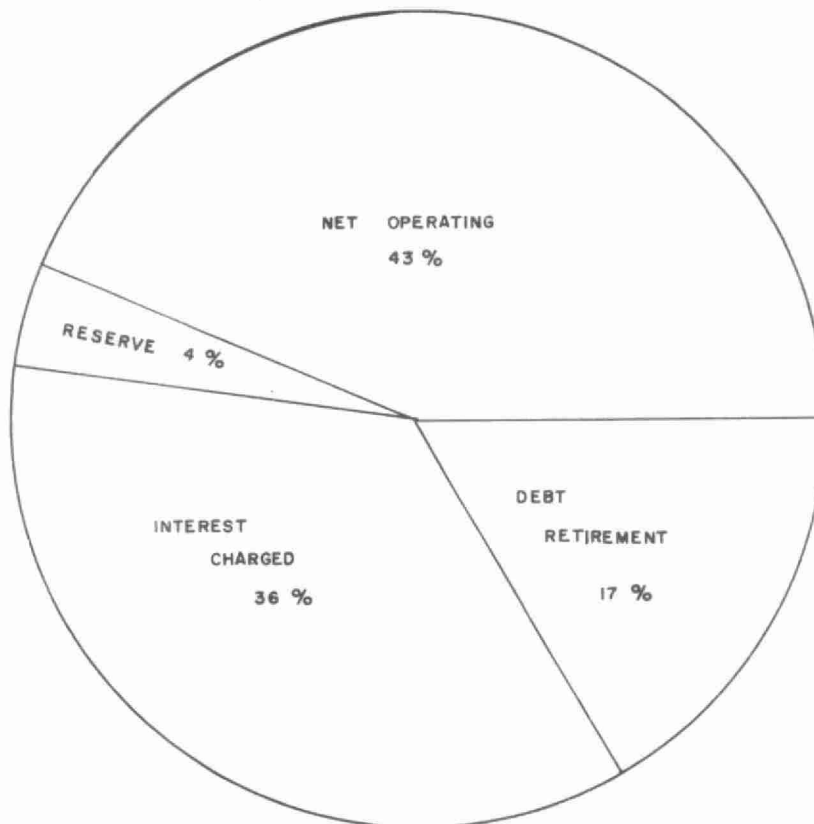
## YEARLY OPERATING COSTS

YEAR	M. G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1962	297.053	\$ 56400.48	\$ 189.86	22 CENTS
1963	336.397	60754.91	180.60	21 CENTS
1964	425.527	57818.45	135.88	17 CENTS
1965	731.513	64498.43	88.17	11 CENTS
1966	682.856	65868.62	96.46	13 CENTS
1967	802.958	71358.82	88.87	11 CENTS

1967 OPERATING COSTS  
( 2 - 0047 - 59 )



TOTAL ANNUAL COST  
( ALL PROJECTS )



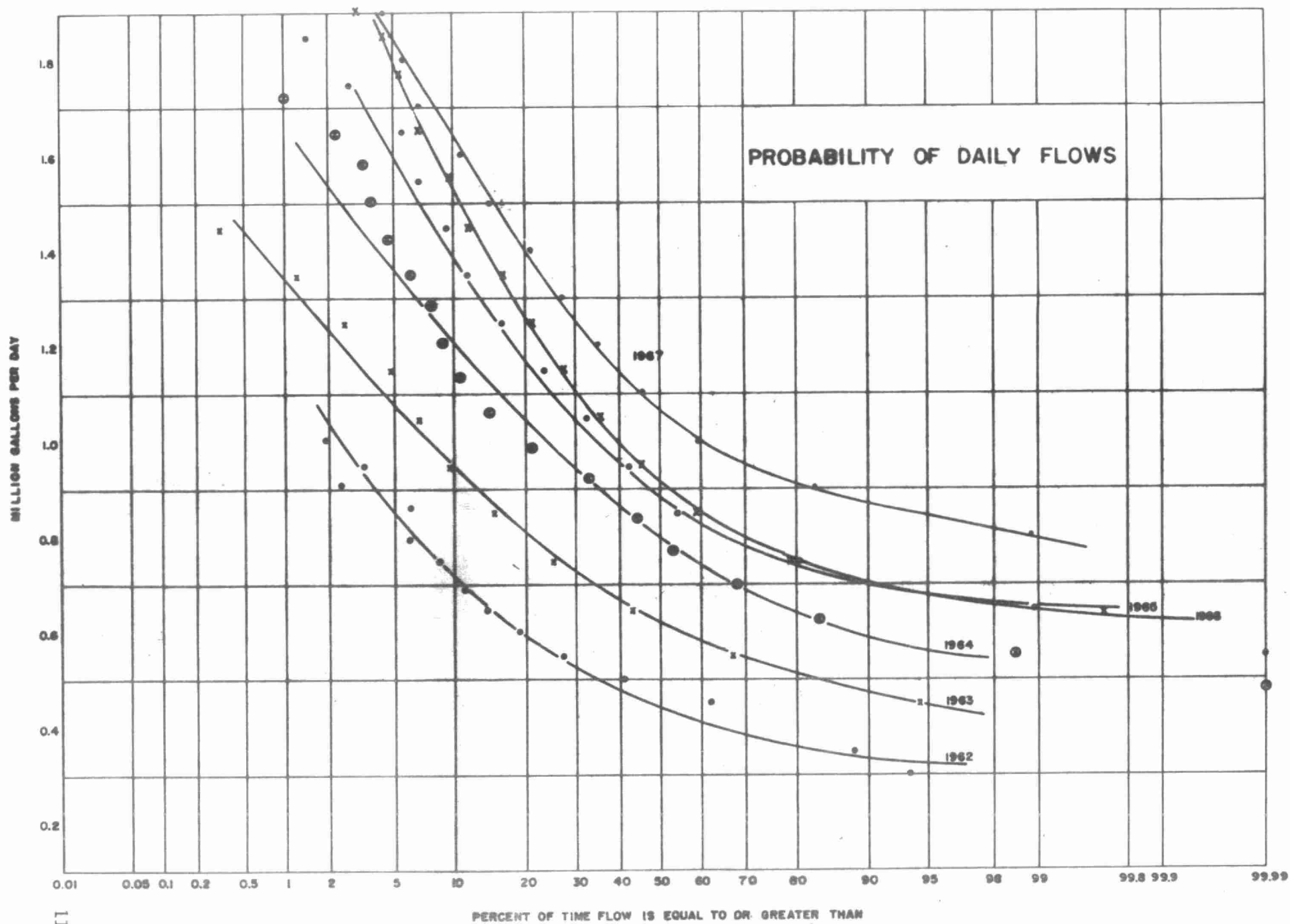
## Process Data

### GENERAL

The following data provide information regarding the flows treated by the two Port Colborne Water Pollution Control Plants, the degree of treatment achieved, the digester performance and, in the case of the West Side plant, the chlorine dosages required to maintain a safe residual.

### FLOW - WEST SIDE PLANT

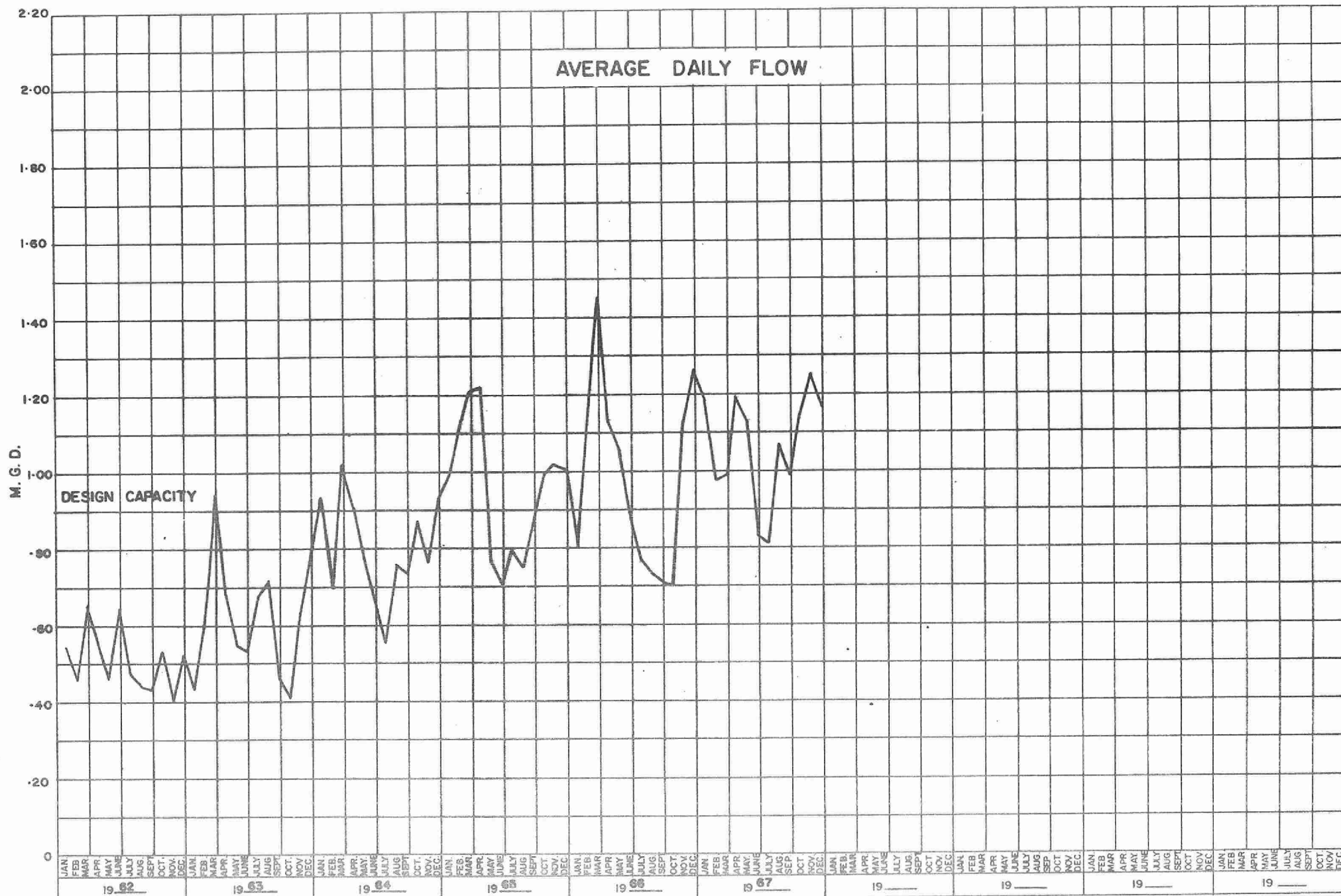
During 1967 a total of 388,046 million gallons of raw sewage was given secondary treatment. This is an increase of approximately 8.6 percent over the 1966 total flow. The average daily flow of 1.06 million gallons is slightly over the design dry weather hydraulic capacity of the plant. The maximum average daily flow for one month was 1.257 million gallons and occurred in November. The graph on probability of daily flows shows that the design dry weather flow at the West Side plant of .9 mgd was exceeded 83 percent of the time. This hydraulic overloading is primarily due to excessive infiltration into the municipal sewer system. Although an undesirable feature, the hydraulic overloading is not yet seriously affecting the degree of treatment being achieved at the plant.

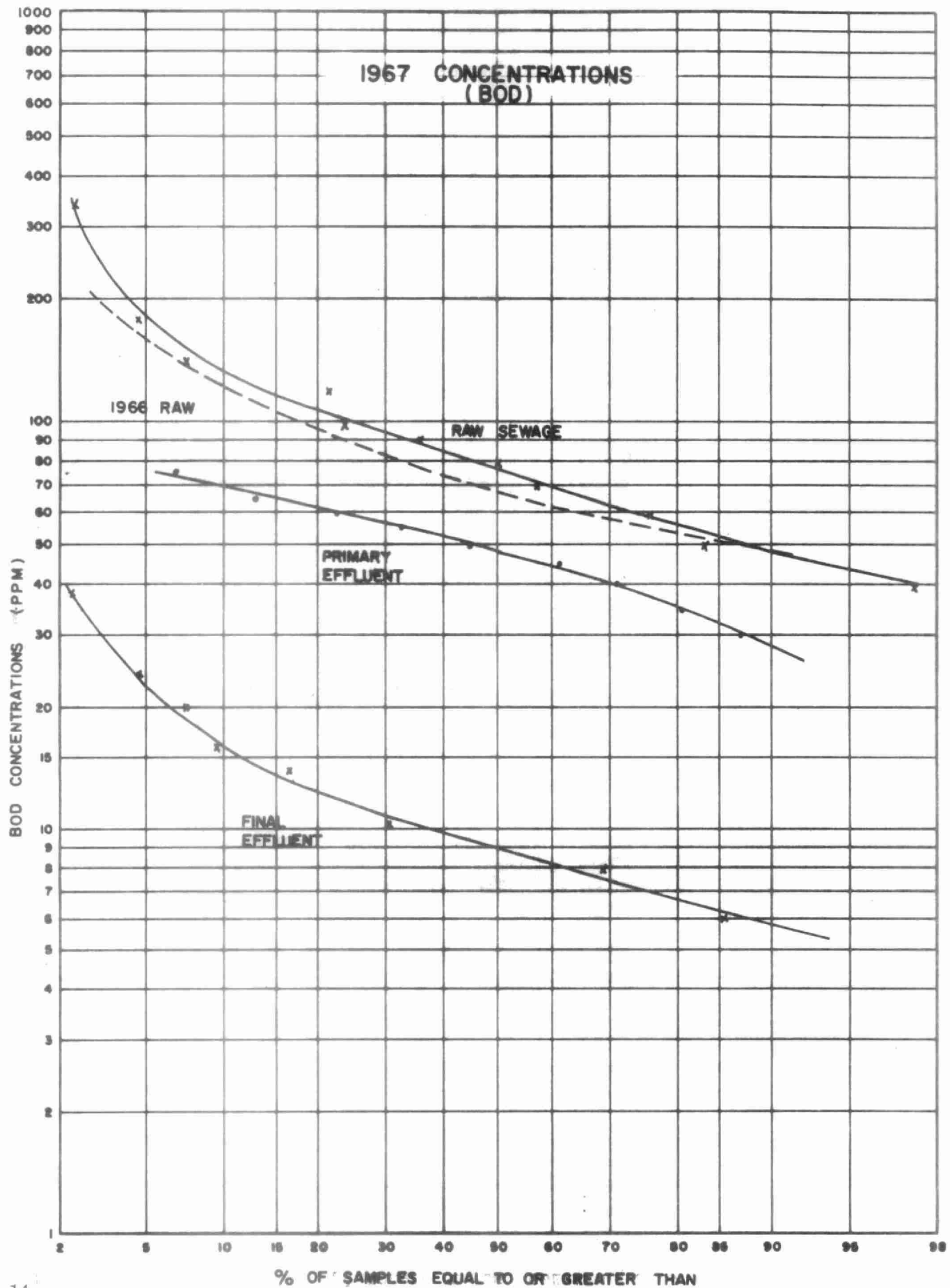


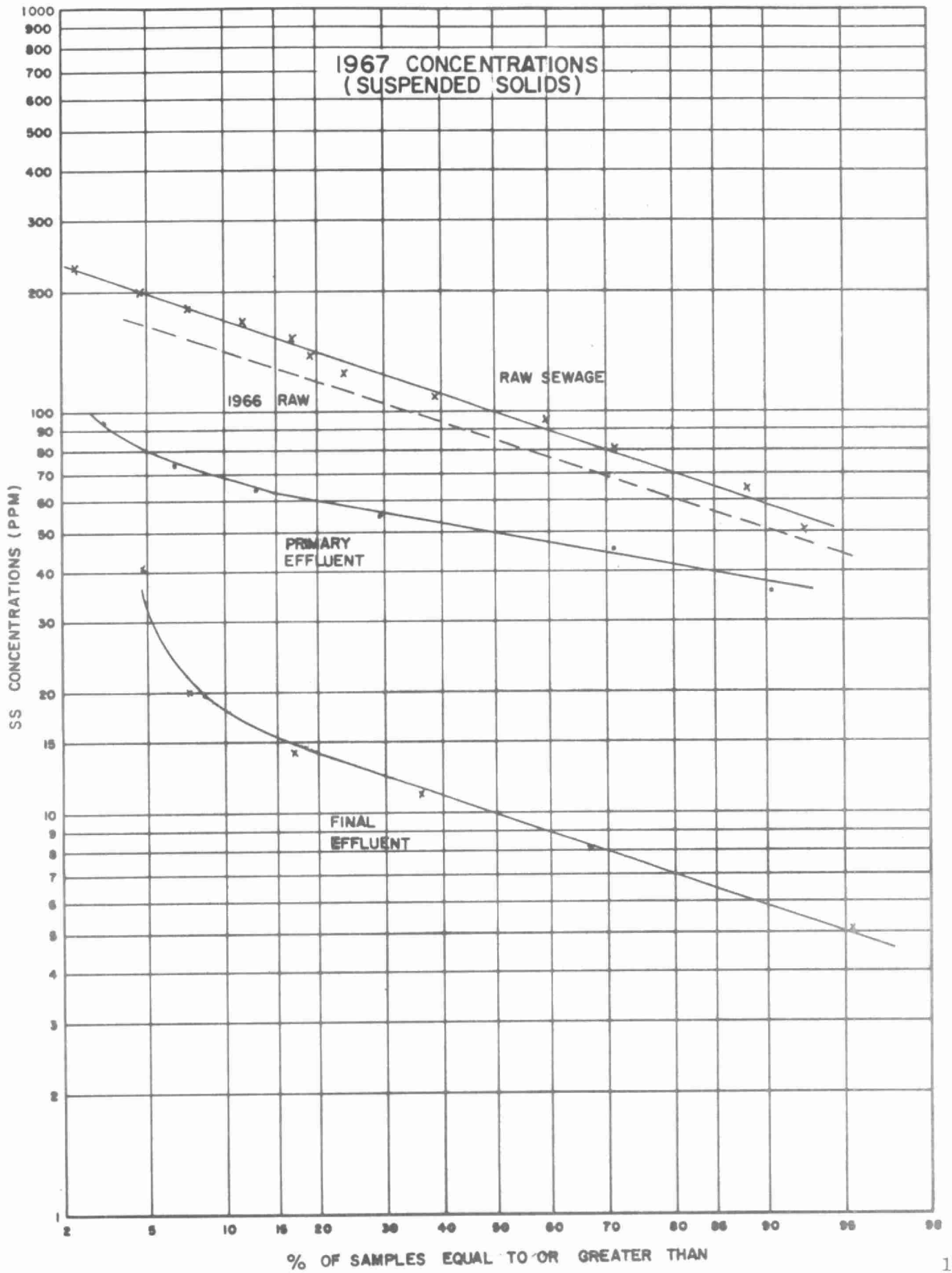
# **FLOW DATA**

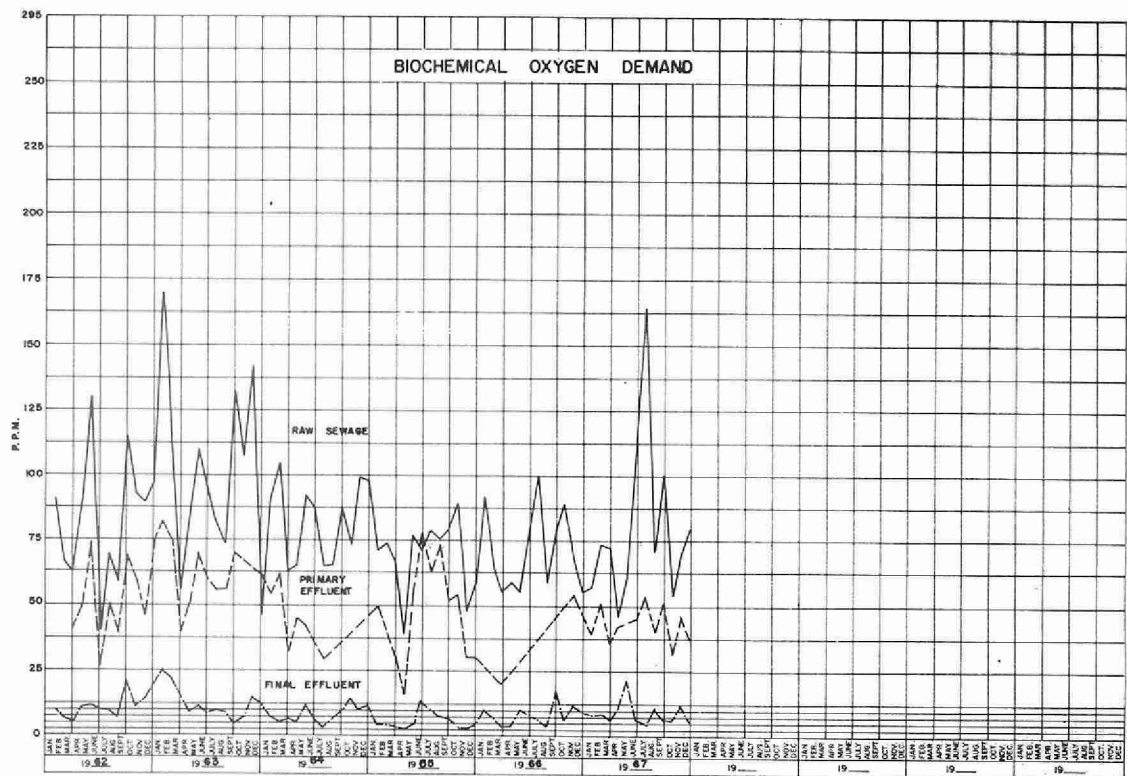
Month	Total Flow ( MG )	Avg. Daily Flow (MGD)	Max. Daily Flow ( MG )	Min Daily Flow (MG)	Max. Rate (MGD)	Min. Rate (MGD)
January	36.680	1.183	1.921	.845	2.000	0
February	27.371	.978	1.828	.672	4.500	0
March	30.575	.986	1.535	.678	1.600	0
April	35.944	1.198	1.918	.858	2.200	0
May	35.077	1.132	2.062	.700	2.300	0
June	25.142	.838	1.322	.655	1.500	0
July	25.326	.817	.901	.711	1.100	0
August	33.193	1.070	1.781	.815	2.200	0
September	29.420	.981	2.184	.722	1.500	0
October	35.495	1.145	2.114	.723	2.300	0
November	37.698	1.257	1.849	.763	1.600	0
December	36.125	1.165	2.105	.882	2.200	0
Total	388.046					
Average	32.337	1.063				



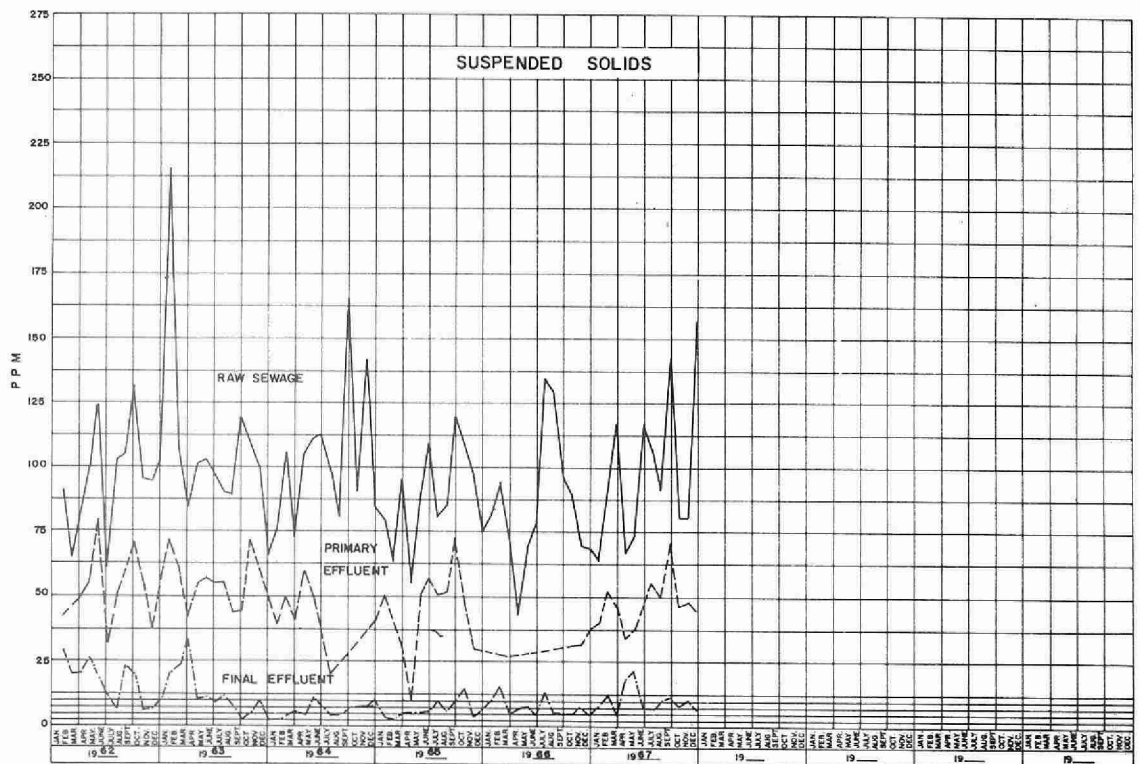








## MONTHLY VARIATIONS



## GRIT, B.O.D AND S.S. REMOVAL

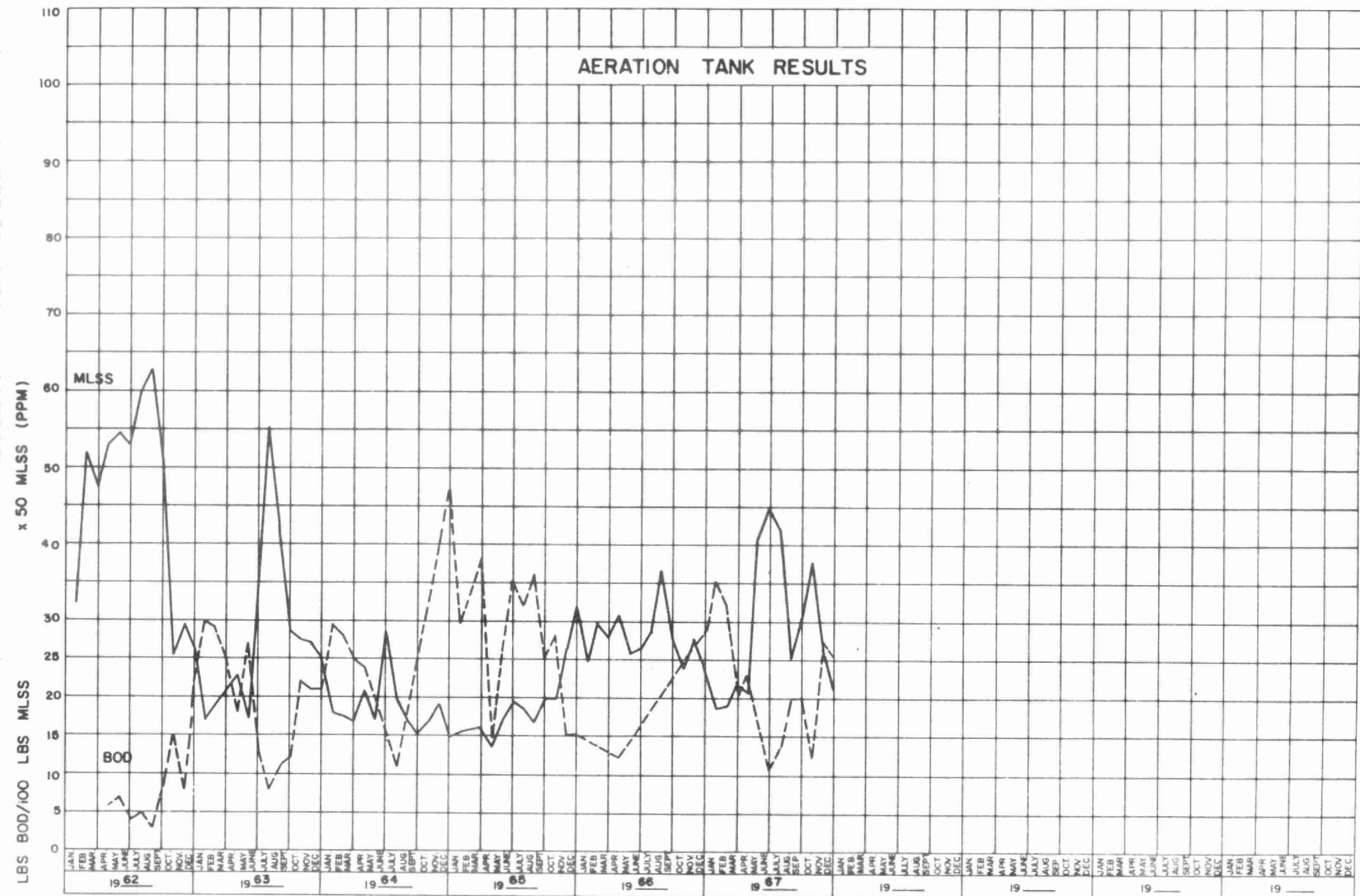
MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	57	7.9	86.1	9.00	62	7	88.7	10.09	-
FEB.	73	8	89.1	8.90	92	11	88.0	11.09	40
MAR.	72	6.1	91.5	10.07	117	4	96.6	17.26	-
APR.	46	11	76.1	6.29	66	17	74.2	8.81	56
MAY	62	22	64.5	7.02	73	21	71.2	9.12	-
JUNE	111	5.7	94.9	13.21	117	7	94.0	14.46	-
JULY	166	43	74.1	15.58	107	6	94.4	12.79	-
AUG.	71	10	85.9	10.12	91	8	91.2	13.78	10
SEPT.	99	7.4	92.5	13.47	140	10	92.5	19.12	12
OCT.	53	6.1	88.5	8.32	80	7	88.5	12.96	12
NOV.	70	10.9	84.4	11.14	80	8	90.0	13.57	-
DEC.	80	6.2	92.3	13.33	162	6	96.3	28.18	30
TOTAL	-	-	-	133.47	-	-	-	171.23	160
AVG.	80	12	85.0	11.12	99	9	90.9	14.27	14

### COMMENTS

The biochemical oxygen demand (BOD) and suspended solids (SS) raw sewage received at the West Side plant are, once again, below normal for domestic sewage. The average strength of the raw sewage in 1967 was 80 ppm BOD and 99 ppm SS. Both of these values represent a slight increase over 1966 strengths. Because of the relatively low organic loadings, the plant is capable of handling hydraulic loadings, which exceed the dry weather flow designed for the plant. The average effluent quality of 12 ppm BOD and 9 ppm suspended solids is within OWRC objectives of 15 ppm. Treatment during the month of July was poor as a result of maintenance performed on the aeration section.

The grit removal of 14 cubic feet per month is not uncommon in this instance where sewers are flat and multiple pumping of raw sewage is necessary.

## AERATION TANK RESULTS

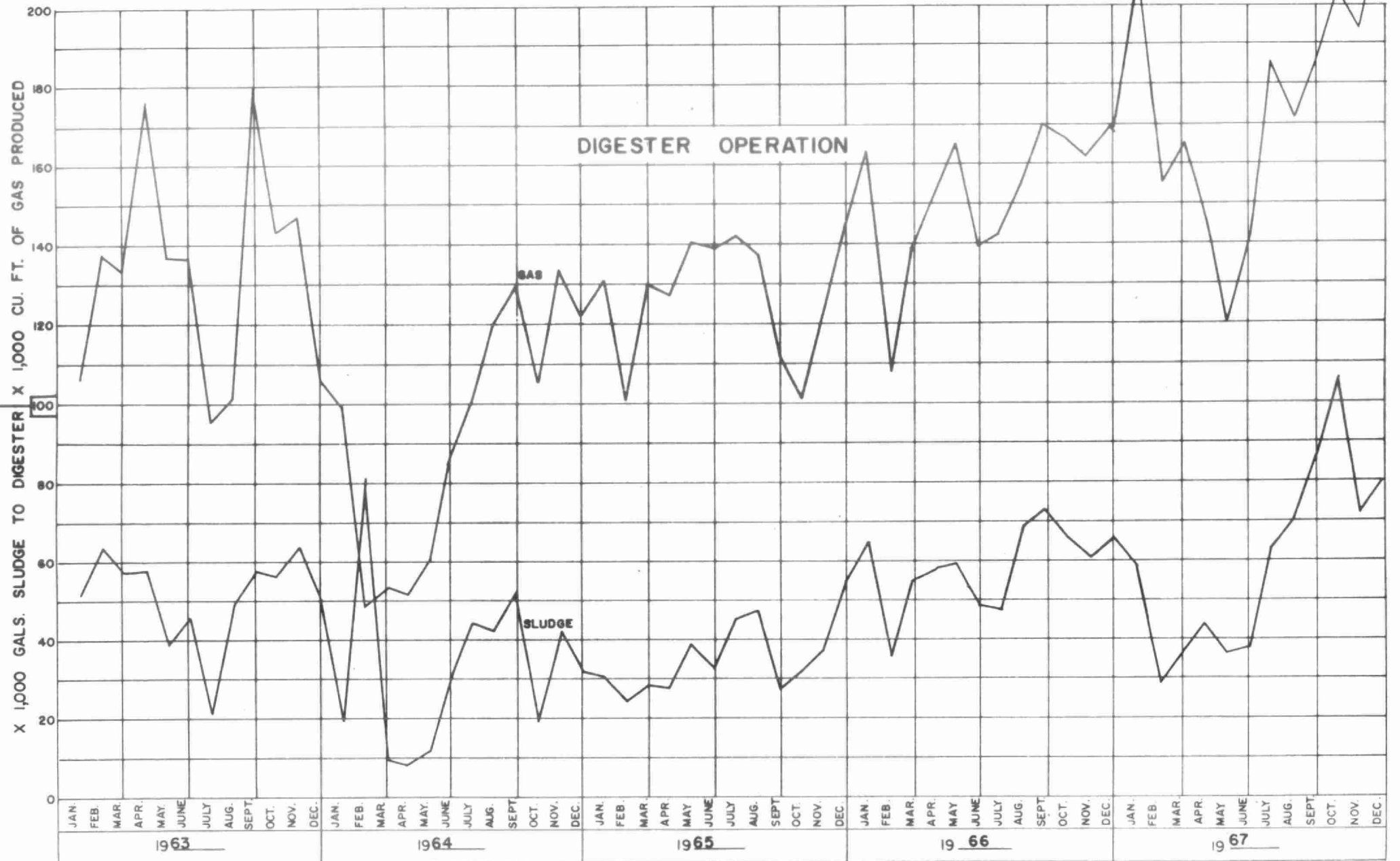


## AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.
JANUARY	44	903	35
FEBRUARY	51	947	32
MARCH	35	1075	20
APRIL	42	1035	23
MAY	43	2013	16
JUNE	45	2248	10
JULY	54	2099	13
AUGUST	39	1250	20
SEPTEMBER	51	1510	20
OCTOBER	32	1877	12
NOVEMBER	45	1272	27
DECEMBER	37	1041	25
TOTAL	-	-	-
AVERAGE	43	1439	21

### COMMENTS

Again in 1967 due to low organic loadings, only one-third of the aeration section was operated. MLSS were maintained at an average 1439 ppm. A BOD removal of 46 percent in the primary clarifier indicates excellent efficiency from this treatment unit.





## DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	GALLONS	% SOLIDS	% VOL. MAT.	GALLONS	% SOLIDS	% VOL. MAT.	
JAN.	58,840	4.9	76.2	30,000	2.00	60.50	209.645
FEB.	27,930	6.2	77.4	20,000	1.96	59.69	153.736
MAR.	35,585	5.6	78.9	26,000	1.89	-	163.233
APR.	43,050	4.5	74.0	10,000	2.19	60.27	146.027
MAY	35,640	5.0	76.8	34,000	2.02	59.90	119.463
JUNE	37,300	5.4	78.0	10,000	1.79	61.45	142.453
JULY	61,825	4.3	76.0	28,000	-	-	185.799
AUG.	68,635	4.2	74.3	10,000	.37	-	171.829
SEPT.	85,520	-	-	40,000	-	-	185.271
OCT.	106,520	4.6	75.0	40,000	4.31	60.33	205.087
NOV.	71,945	3.8	73.8	40,000	3.27	60.86	194.749
DEC.	78,715	4.1	75.1	30,000	-	-	231.633
TOTAL	711,505	-	-	318,000	-	-	2108.925
AVG.	59,292	4.7	69.6	26,500	2.20	60.43	175.744

### COMMENTS

A total of 711,505 gallons of raw sludge was pumped to the digesters during 1967. The average solids content of 4.7 percent is somewhat improved from 1966. Better than half of this amount was removed from the secondary digester as supernatant with a total of 318,000 gallons hauled from the plant by the sludge haulage contractor. The digesters were 40 percent efficient in the reduction of volatile matter in the raw sludge.

Gas production was again increased reflecting an increased solids content in the raw sludge.

## CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	36,680	751	2.04
FEBRUARY	27,371	615	2.25
MARCH	30,575	710	2.32
APRIL	35,944	990	2.75
MAY	35,077	1056	3.01
JUNE	25,142	554	2.20
JULY	25,326	549	2.17
AUGUST	33,193	1082	3.26
SEPTEMBER	29,420	1179	4.00
OCTOBER	35,495	1010	2.85
NOVEMBER	37,698	960	2.55
DECEMBER	36,125	768	2.12
TOTAL	388,046	10224	-
AVERAGE	32,337	852	2.63

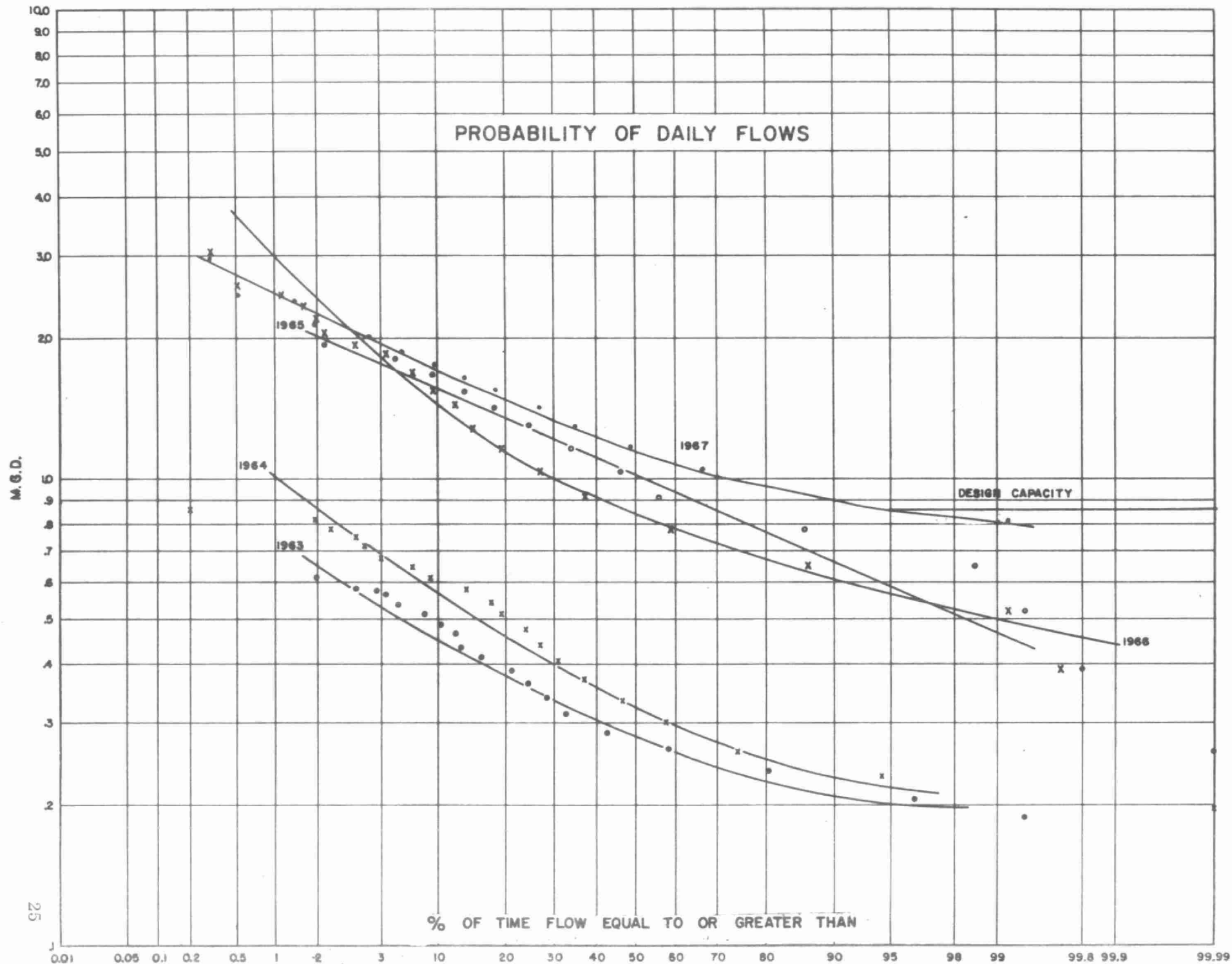
MGD - 1,063

## COMMENTS

Chlorination of the final effluent is practiced for the entire year at the West Side plant. An average residual after 15 minutes of 0.5 ppm is maintained in order to ensure adequate disinfection. A dosage of 2.63 ppm was necessary to maintain this residual.

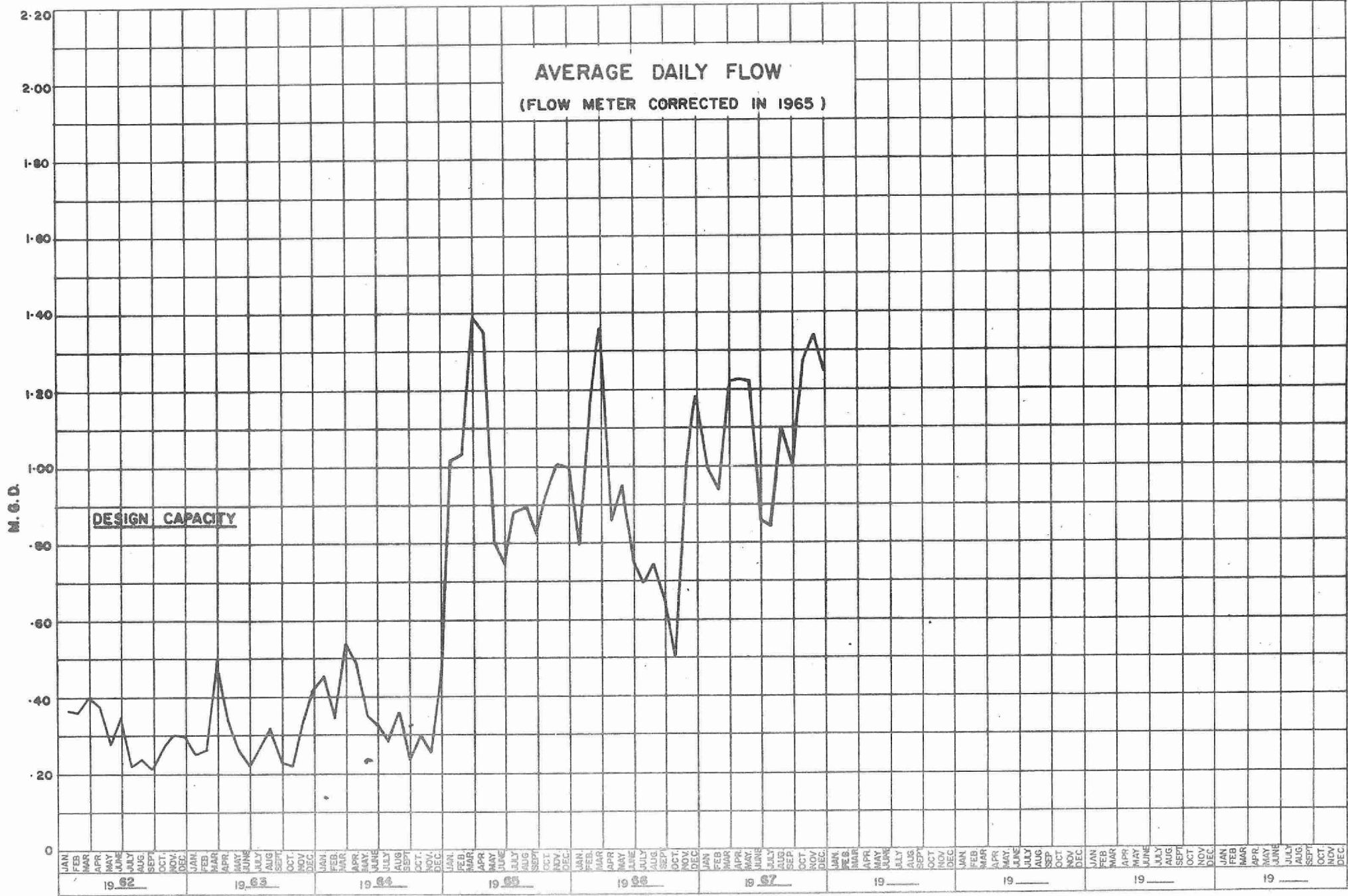
#### FLOW - EAST SIDE PLANT

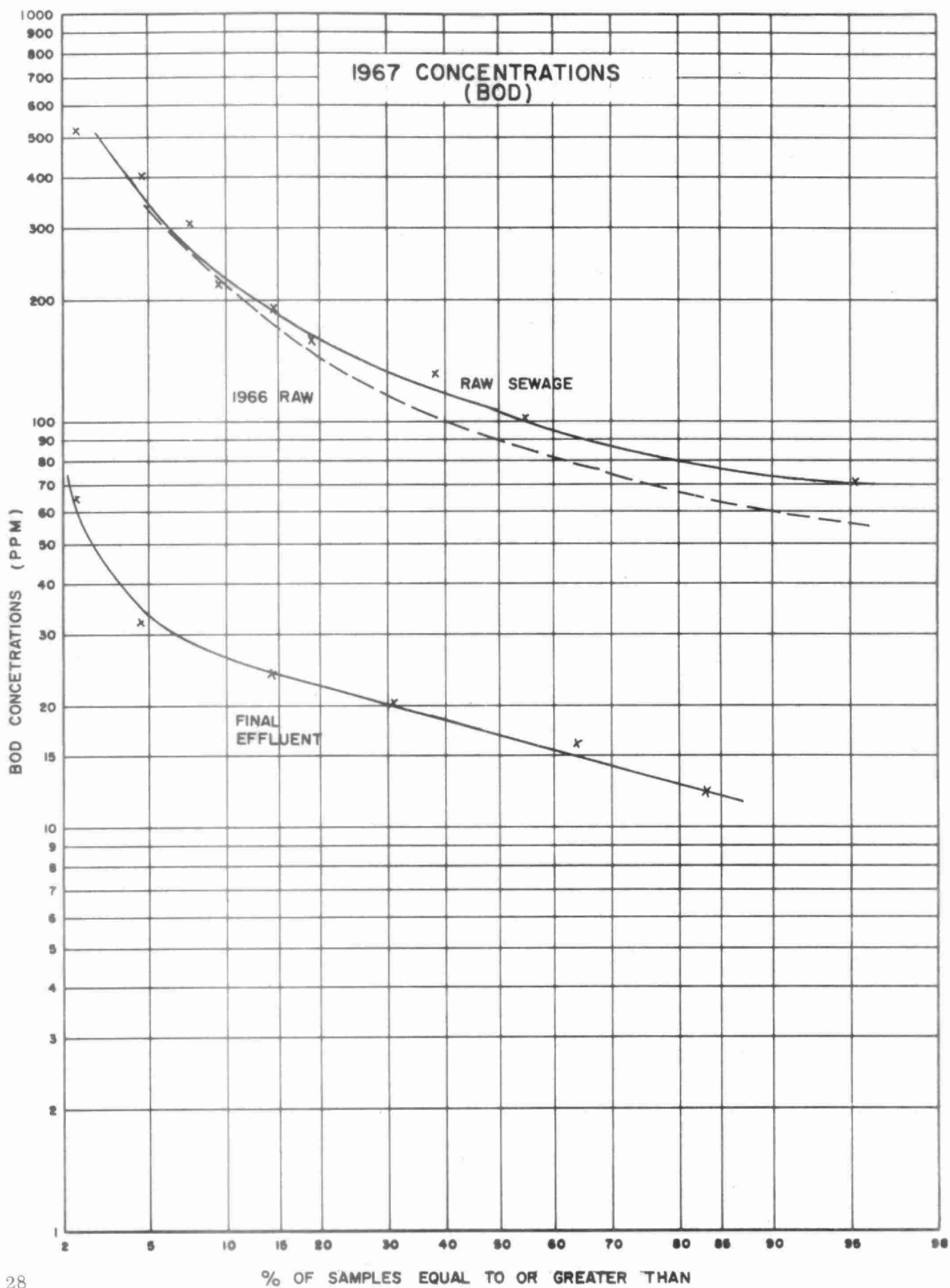
During 1967 a total of 414.9 million gallons of raw sewage was given secondary treatment at the East Side plant. This was an increase of 27.5 percent over the 1966 total flow. The average daily flow for the year was 1.1 million gallons and the maximum average daily flow for one month of 1.4 million gallons occurred in April. As in previous years, there was considerable by-passing of raw sewage directly to the canal during periods of flow in excess of the capabilities of the plant. Much of the very high flow originates from the Fretz Park area. Due to limitations in the flow metering equipment, the recorded flows should be considered as estimates only.

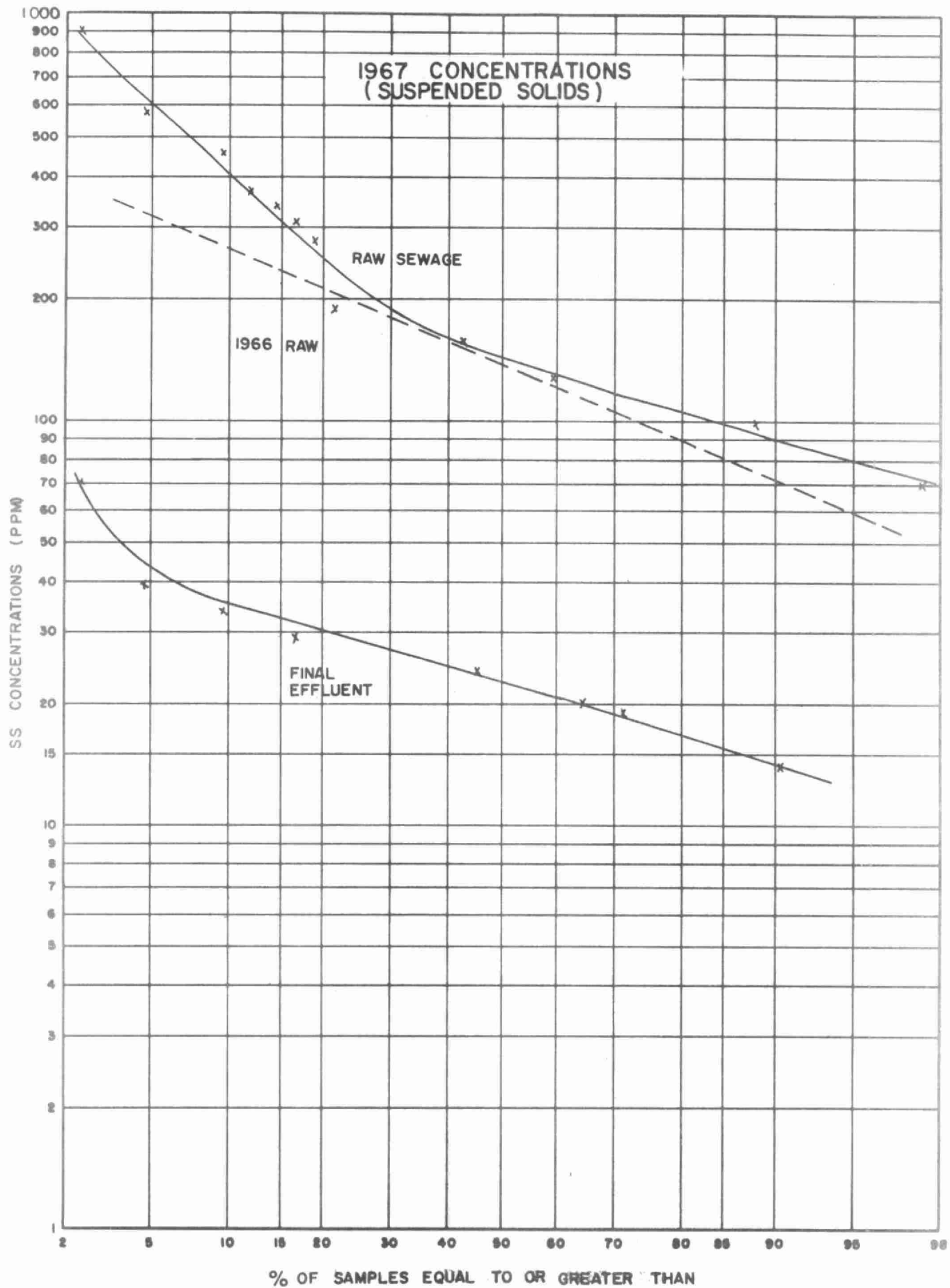


# **FLOW DATA**

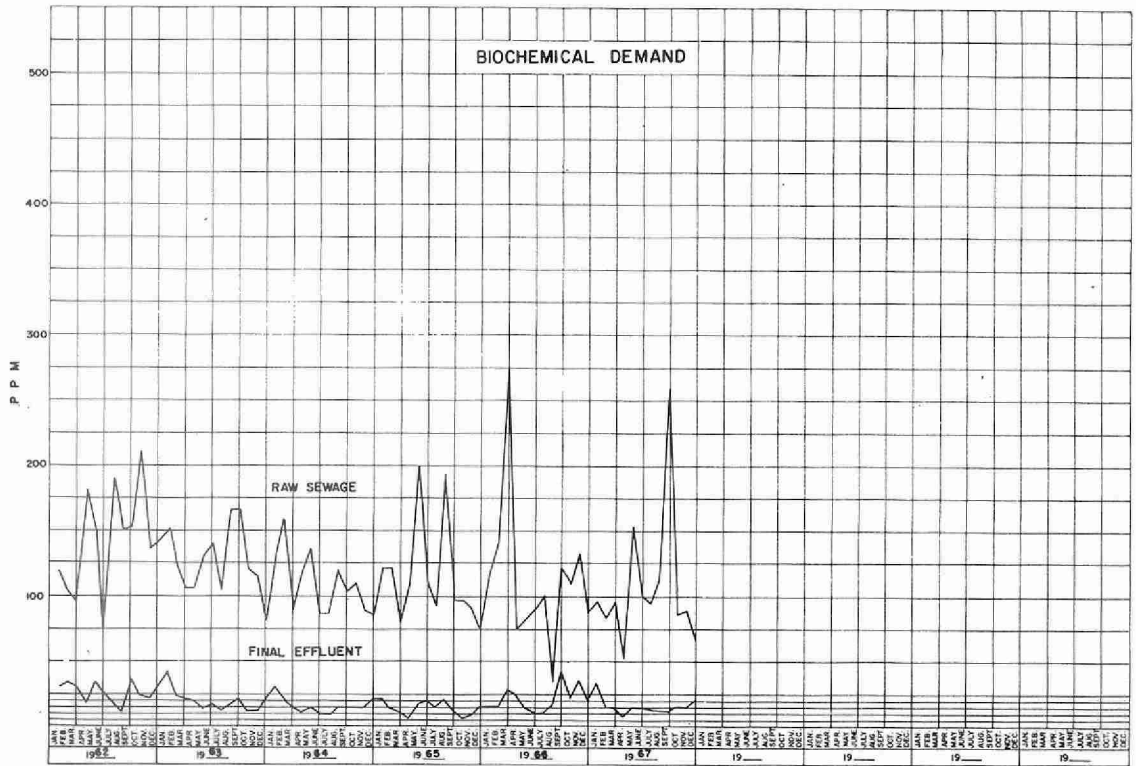
Month	Total Flow (MG)	Avg. Daily Flow (MGD)	Max. Daily Flow (MG)	Min Daily Flow (MG)	Max. Rate (MGD)
January	32.103	1.035	2.000	.723	4.000
February	26.360	.941	2.300	.710	3.300
March	37.580	1.212	1.900	.785	3.700
April	41.305	1.377	3.500	.905	1.300
May	40.776	1.315	2.955	.785	2.000
June	26.096	.870	1.370	.695	2.050
July	26.547	.856	.950	.625	2.100
August	34.445	1.111	1.780	.765	5.000
September	30.540	1.018	2.000	.700	2.100
October	39.965	1.289	1.920	.869	2.100
November	40.415	1.347	1.860	.965	2.100
December	38.780	1.251	1.750	.830	2.200
Total	414.912	1.137			
Average	34.576				



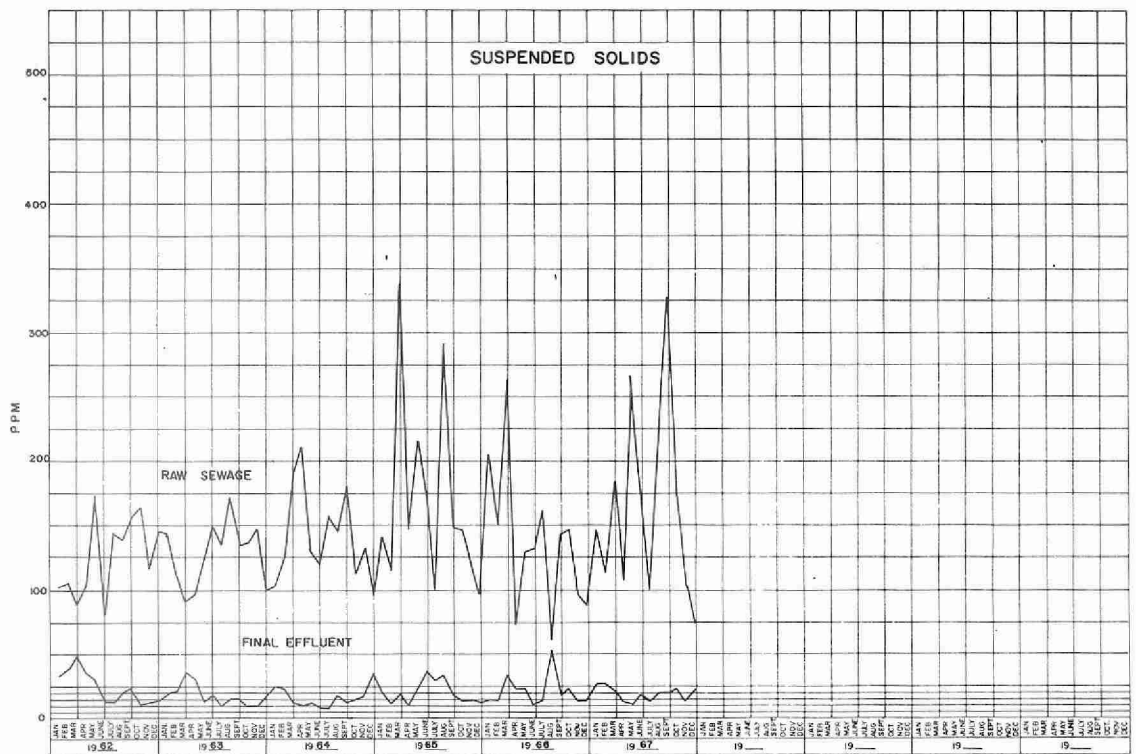








## MONTHLY VARIATIONS



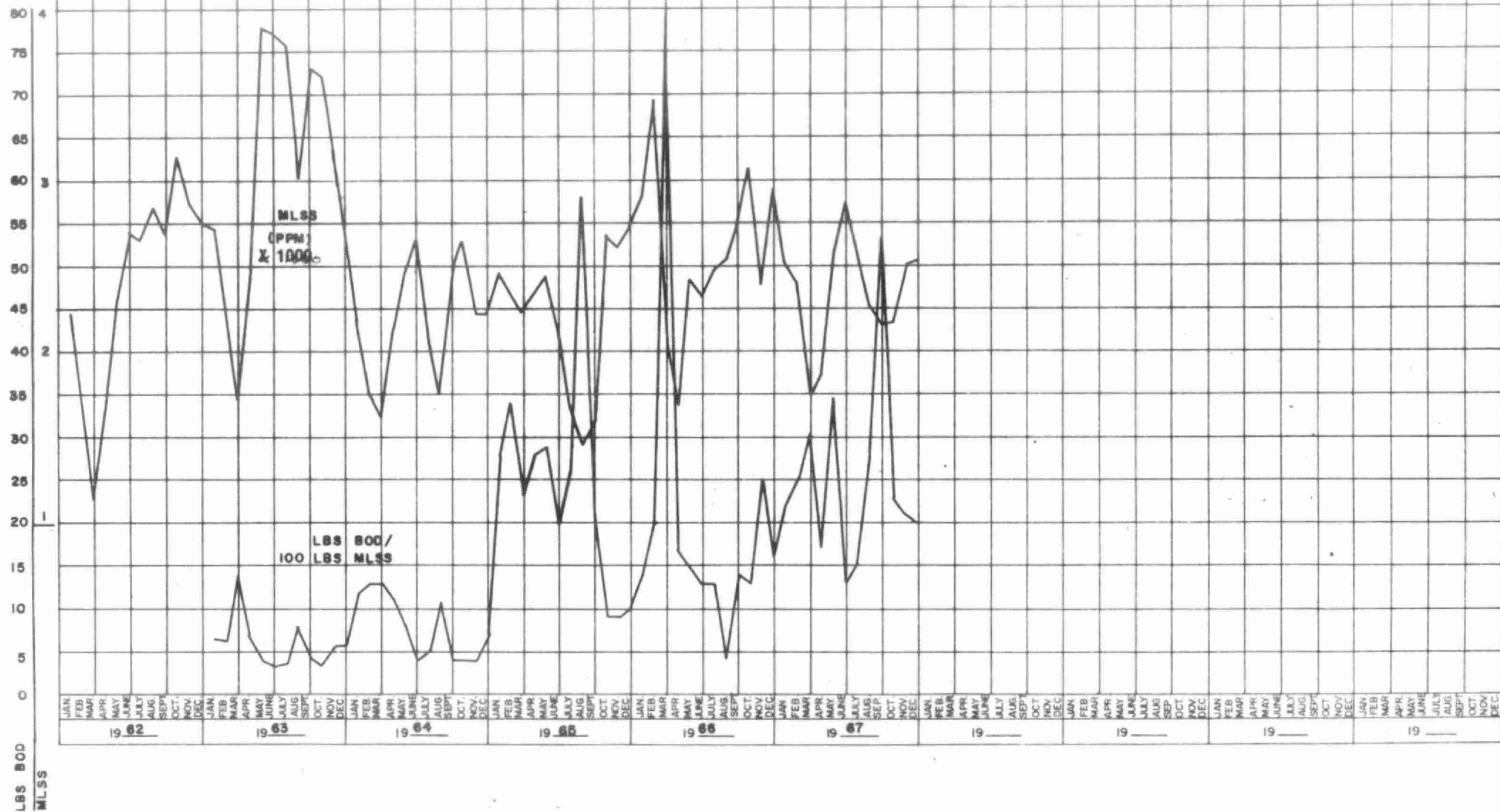
## GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	95	31	67.4	10.27	150	26	83.7	19.90	19
FEB.	83	14	83.1	9.09	113	27	76.1	11.34	18
MAR.	95	13	86.3	15.41	183	22	88.0	30.25	34
APR.	51	6.3	87.6	9.23	106	14	86.8	19.00	58
MAY	151	14	90.7	27.93	265	12	95.5	51.58	40
JUNE	101	13	87.1	11.48	158	18	88.6	18.27	-
JULY	94	12.8	86.4	10.78	101	14	86.2	11.55	30
AUG.	114	13	88.6	17.39	241	18	92.5	38.41	30
SEPT.	259	11.4	95.6	37.81	329	20	93.9	47.18	34
OCT.	85	15	82.4	13.99	173	22	87.3	30.17	18
NOV.	88	14.3	83.8	14.89	107	14	86.9	18.79	16
DEC.	61	18	70.5	8.34	75	21	72.0	10.47	-
TOTAL	-	-	-	186.61	-	-	-	306.91	297
AVG.	106	14.7	84.1	15.55	167	19	86.4	25.58	27

### COMMENTS

The BOD and SS of 106 ppm and 167 ppm respectively are higher than those at the West Side plant but are still somewhat below that anticipated in normal domestic sewage. The treatment efficiency of 84.1 percent BOD reduction and 86.4 percent SS reduction is adequate when taking into account the general condition of the plant and the extreme flow variations in the raw sewage. The above chart does not reflect the large quantities of raw sewage by-passed during storm flows nor does it reflect the fact that part of the aeration equipment was out of service during the winter due to mechanical failure. The quantity of grit removed averaged 27 cubic feet per month which is an increase over the 1966 value of 19 cubic feet.

## AERATION TANK RESULTS



## AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	MLSS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.
JANUARY	95	2510	22
FEBRUARY	83	2405	25
MARCH	95	1724	30
APRIL	51	1869	16
MAY	151	2558	35
JUNE	101	2869	13
JULY	94	2575	15
AUGUST	114	2280	29
SEPTEMBER	259	2166	55
OCTOBER	85	2181	23
NOVEMBER	88	2521	21
DECEMBER	61	2546	20
TOTAL	-	-	-
AVERAGE	106	2350	25

### COMMENTS

The MLSS were maintained during the past year at slightly lower level than the previous year. However, the slightly weaker organic strength of the raw sewage resulted in a lower loading in terms of pounds of BOD per 100 pounds of MLSS. An average of 2350 ppm SS was maintained in the aeration tank during 1967.

## DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	GALLONS	% SOLIDS	% VOL. MAT.	GALLONS	% SOLIDS	% VOL. MAT.	
JAN.	79,000	1.6	80.0	54,000	1.66*	59.63*	85.021
FEB.	82,000	2.0	79.0	16,000	1.36*	72.05*	82.257
MAR.	67,000	1.8	82.0	24,000	1.09*	-	82.343
APR.	90,000	2.4	75.0	14,000	6.70	77.80	92.501
MAY	91,000	1.9	77.3	4,000	2.22*	59.90*	93.934
JUNE	120,000	2.0	76.0	12,000	.82*	62.20*	72.323
JULY	97,000	1.5	36.2	34,000	-	-	78.733
AUG.	89,000	-	-	16,000	-	-	32.858
SEPT.	96,000	1.3	56.0	44,000	2.20*	-	56.512
OCT.	77,000	1.9	94.2	24,100	1.43*	58.74*	50.701
NOV.	88,000	2.0	76.4	34,000	1.62*	59.26*	60.989
DEC.	91,230	2.3	77.0	20,000	-	-	91.272
TOTAL	1067,230	-	-	296,100	-	-	869.444
AVG.	88,935	1.9	73.6	24,675	2.12	66.23	72.454

\* - Lab. analysis

### COMMENTS

A total of 1,067,230 gallons of raw sludge was pumped to the digester in 1967 and 296,100 gallons of digested sludge were removed from the plant by sludge haulage contractor. The balance was returned to the plant as supernatant from the digester. The raw sludge averaged 1.9 percent solids with the average concentration of the digested sludge being 2.12 percent solids.



## **CONCLUSIONS**

The West Side plant continued to produce a satisfactory effluent in 1967. There was an increase in the degree of hydraulic overloading during the past year with the plant being hydraulically overloaded (DWF) 83 percent of the time.

Considerable hydraulic overloading at the East Side plant continued to present a pollution problem. In addition, the extremely poor condition of the mechanical and electrical equipment has caused frequent breakdowns resulting in inefficient treatment. The plant is generally inadequate to treat average daily flows presently collected from the East Side of the municipality.

## **RECOMMENDATIONS**

### **WEST SIDE PLANT**

A program for reducing storm and ground water infiltration into the sanitary sewers should be undertaken by the municipality.

### **EAST SIDE PLANT**

It is strongly recommended that renovations be immediately carried out to correct outstanding deficiencies at the East Side plant, in order to ensure adequate treatment of sewage for the east side of the city until the plant is either extended or replaced.

In addition, a program for reducing storm and ground water infiltration to the sanitary sewers should be undertaken by the municipality.

